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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,041	07/03/2003	Ja-Hum Ku	2557-000153/US	4261

30593 7590 12/30/2004

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EXAMINER
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PERT, EVAN T

ART UNIT	PAPER NUMBER
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2829

DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/612,041

Applicant(s)

KU ET AL.

Examiner

Evan Pert

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-69 is/are pending in the application.
- 4a) Of the above claim(s) 2-5, 12, 14, 15, 20-37, 41, 42, 50 and 52-69 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20 and 38 is/are allowed.
- 6) ☒ Claim(s) 1, 6-11, 13, 16-19, 38-40, 43-49 and 51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1104.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election with traverse of Species A1B1C1D1 in the reply filed on July 30, 2004 is acknowledged.

The traversal is on the grounds that 1) the "claims to be restricted to species must be mutually exclusive," 2) a reasonable number of species are allowed in an application, 3) the claimed subject matter is "sufficiently related," and 4) that the restriction creates "unnecessary delay and expense to applicant's duplicative examination by the Patent Office." This is not found persuasive.

While reason "4" *suggests* that claims withdrawn by applicant's election are not patentably distinct, the examiner refrains from considering this an admission of obvious variants among the "species."

With regard to reason "1", the claims "to be restricted to species" are indeed to be mutually exclusive. However, this argument is not applicable because the previous examiner restricted based on disclosed *embodiments*, and did not "restrict claims to species." Applicant correctly points out that "claims 1 and 43 are not mutually exclusive from claims 20 and 58." Since these are generic claims, however, and are not species claims, these claims do not have to be mutually exclusive.

With regard to reason "2", claims pending for consideration are a *collection* of genus, sub-genus and species claims [MPEP 806.04(e)]. Applicant is entitled an enormous number of species *when there is an allowable generic claim*. Applicant is entitled to examination of a generic claim, wherein allowability of the generic claim necessitates rejoinder (even of an enormous number of specifically claimed species in a large number of dependent claims).

Regarding reason "3", the claims are broad so that a broadest reasonable interpretation of the claimed subject matter encompasses many references in many places (i.e. diverse subject matter and wasted time for the examiner, which is a "serious burden.")

Regarding reason "4", if there is truly any undue delay and expense, it is applicant's own strategy of prosecuting this case, not the restriction requirement. If applicant had presented an allowable generic claim, the restriction requirement would have been withdrawn.

The requirement is still deemed proper and is therefore made FINAL.

Claims 2-5, 12, 14-15, 20-37, 41, 42, 50, and 52-69 are withdrawn from consideration, being "non-elected" as designated by applicant [page 2, 7-30-04], there being no allowable generic claim.

Claims 1, 6-11, 13, 16-19, 38-40, 43-49 and 51 are pending for consideration.

***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Specification***

3. Paragraph [0001] should be deleted as being redundant over field [30] of an issued patent. If the priority document is required for incorporation of essential subject matter, applicant should provide a complete and accurate translation in English [in the spirit of MPEP 608.01(p)(I)].

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 43-49 and 51 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains to practice the invention.

In claim 43, the combination of the steps of "*maintaining* a nitrogen atmosphere in a reaction chamber" and "forming a silicon oxide layer" necessarily form a silicon "oxynitride," not a "silicon oxide." For example, see the article to S.C. Song et al., where Si subjected to  $\text{NH}_3$  and  $\text{N}_2\text{O}$  forms an "oxynitride" (i.e.  $\text{Si}_x\text{O}_y\text{N}_z$ ).

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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5. Claims 1, 6, 7, 9, 10, 17, 39 and 40 rejected under 35 U.S.C. 102(b) as being anticipated by Lin (US 6,218,314).

Regarding claim 1, Lin discloses a method of fabricating a semiconductor device having a silicon oxide layer (abstract) comprising: supplying a nitrogen source gas (col. 4, lines 24-29) to a reaction chamber to create a nitrogen atmosphere in the reaction chamber (wherein a nitrogen atmosphere is considered as an atmosphere with at least 33% nitrogen per col. 2, line 50); and supplying a silicon source gas and an oxygen source gas (col. 4, lines 24-40) to the reaction chamber (i.e. "reactor") to deposit a silicon dioxide layer (22) on a semiconductor substrate of the semiconductor device (10).

Regarding claims 6 and 7, the nitrogen source gas is "preferably" ammonia (col. 4, line 25).

Regarding claim 9, the silicon source gas is "preferably  $\text{SiH}_4$ " [col. 4, line 27].

Regarding claim 10, the oxygen source gas is "preferably" nitric or nitrous oxide (col. 4, line 24).

Regarding claim 17, the thermal chemical vapor deposition process is a PECVD process, like applicant's per claim 18.

Regarding claim 39, the nitrogen source gas is resolvable at a low temperature (because the nitrogen source gas is  $\text{NH}_3$ ).

Regarding claim 40, the substrate is necessarily "loaded into the reaction chamber" [col. 2, lines 51-52].

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 8, 11, 13, 16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin as applied to claims 1 and 7 above, and further in view of Official Notice.

Regarding claims 8 and 16, Lin is silent about the exact flow rates, temperatures and pressure claimed, but does state that "these parameters can be scaled up or down keeping the gases and other parameters in proportions" [col. 4, lines 38-40].

The examiner takes Official Notice that the courts have held lack of patentability when a claim differs from prior art merely by adjustment of numerical ranges differing from prior art, unless an unexpected result is of record.

It would have been obvious to perform routine experimentation to adjust pressure, temperature and gas flow to ranges as claimed, motivated to adjust in order to "accommodate difference sized chambers/reactors as is known to those skilled in the art" [col. 3, lines 31-34].

Regarding claims 11 and 13, the courts have held that changing the order prior art process steps is not patentable unless unexpected results are achieved.

Regarding claim 18, Lin is silent about "remote plasma," yet it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to adopt remote plasma for the PECVD of Lin, motivated by the fact that a remote plasma is less damaging, as is known to those of skill in the art.

Regarding claim 19, Lin is silent about a silicon nitride layer being formed on the semiconductor substrate before the formation of the oxide layer. yet, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to form a silicon nitride in forming the semiconductor structure 10, for example, such as part of a masking step in a LOCOS process [see MPEP 2114].

#### ***Allowable Subject Matter***

8. Claims 20 and 38 are allowed.
9. The following is a statement of reasons for the indication of allowable subject matter: Applicant's claimed process can be distinguished from prior art in the context of ""dual spacers on sidewalls of gate patterns," as claimed.

#### ***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 571-272-2034. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ETP  
December 27, 2004

  
**EVAN PERT**  
**PRIMARY EXAMINER**